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PTO/SB/21 (02-04)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/710,452	
	Filing Date	07/13/2004	
	First Named Inventor	Jeng-Wei Yang	
	Art Unit		
	Examiner Name		
Total Number of Pages in This Submission	15	Attorney Docket Number	NAUP0470USA1

ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Drawing(s)	<input type="checkbox"/> After Allowance communication to Technology Center (TC)
<input type="checkbox"/> Fee Attached	<input type="checkbox"/> Licensing-related Papers	<input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences
<input type="checkbox"/> Amendment/Reply	<input type="checkbox"/> Petition	<input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
<input type="checkbox"/> After Final	<input type="checkbox"/> Petition to Convert to a Provisional Application	<input type="checkbox"/> Proprietary Information
<input type="checkbox"/> Affidavits/declaration(s)	<input type="checkbox"/> Power of Attorney, Revocation	<input type="checkbox"/> Status Letter
<input type="checkbox"/> Extension of Time Request	<input type="checkbox"/> Change of Correspondence Address	<input type="checkbox"/> Other Enclosure(s) (please identify below):
<input type="checkbox"/> Express Abandonment Request	<input type="checkbox"/> Terminal Disclaimer	
<input checked="" type="checkbox"/> Information Disclosure Statement	<input type="checkbox"/> Request for Refund	
<input type="checkbox"/> Certified Copy of Priority Document(s)	<input type="checkbox"/> CD, Number of CD(s) _____	
<input type="checkbox"/> Response to Missing Parts/Incomplete Application	Remarks	
<input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Winston Hsu, Reg. No.: 41,526
Signature	
Date	8/18/2004

CERTIFICATE OF TRANSMISSION/MAILING			
I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.			
Typed or printed name			
Signature		Date	

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 0.00

Complete if Known

Application Number	10/710,452
Filing Date	07/13/2004
First Named Inventor	Jeng-Wei Yang
Examiner Name	
Art Unit	
Attorney Docket No.	NAUP0470USA1

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 50-3105
Deposit Account Name: North America Intellectual Property Corp.

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1)			(\$) 0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims: -20** = X =
Independent Claims: -3** = X =
Multiple Dependent: =

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 86	2201 43	Independent claims in excess of 3
1203 290	2203 145	Multiple dependent claim, if not paid
1204 86	2204 43	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$) 0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for <i>ex parte</i> reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

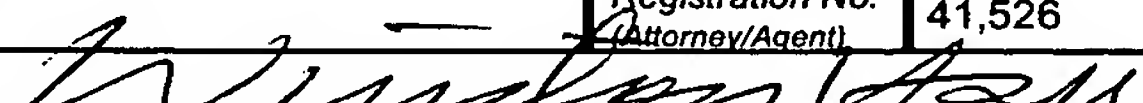
Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 0.00

SUBMITTED BY

(Complete if applicable)

Name (Print/Type)	Winston Hsu	Registration No. (Attorney/Agent)	41,526	Telephone	886289237350
Signature		Date	8/18/2004		

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Jeng-Wei Yang and Tse-Yuan Lo

5 Filing Date: 7/13/2004

Serial No.: 10/710,452

Docket No.: NAUP0470USA1

10 Title: CLEANING COMPOSITION AND METHOD OF WASHING A
SILICON WAFER

To: Commissioner for Patents
P.O. BOX 1450
Alexandria, VA 22313-1450

15

Subject: Information disclosure statement under 37C.F.R. §1.56.

Dear Sir:

20 This is an Information Disclosure Statement in accordance with the duty to
disclose information material to patentability under 37 C.F.R. §1.56. The applicant
wishes to make of record the document listed on the accompanying form
1449A/PTO. It is respectfully requested that the examiner initials the cited reference
on the form and that it be made of record in the application and that a copy of the
25 initialed form be sent to the applicant with the next communication from the examiner.

Since the IDS is filed before the mailing date of a first Office action on the merits,
a petition to request consideration of the information disclosure statement is hereby
requested according to 37 CFR §1.97(b). To comply with 37 C.F.R. §1.97(e), which
30 states that each item of information contained in the information disclosure statement
was first cited in any communications from a foreign application not more than three
months prior to the filing of the information disclosure statement, each item of

information contained in the information disclosure statement was first cited in the communication from the State Intellectual Property Office of People's Republic of China on June 25, 2004 for a counterpart foreign application. The applicant sincerely hopes that the examiner can consider the items contained in this IDS.

5

According to the requirement set forth in 37 C.F.R. §1.98 and M.P.E.P. 609, the applicants are submitting a copy of the cited reference (China Patent No. 1227279A) and a concise explanation of the relevance in this application hereinafter.

10 The objective of CN 1227279A (equivalent to US 6,630,074 B1) is to provide an etchant composition that is effective in removing polymer and via residue from a substrate or conductive material, and especially from an integrated circuit chip having aluminum lines thereon. The etchant composition of the prior art includes an aqueous solution containing about 0.01 to about 15 percent by weight of sulfuric acid,
15 about 0.01 to about 20 percent by weight of hydrogen peroxide, or about 1 to about 30 ppm of ozone, and about 0.1 to about 100 ppm of hydrofluoric acid.

According to the claimed invention of the present application, a cleaning composition comprises a first acid for removing copper from the silicon wafer surface,
20 an oxidizing agent for oxidizing the silicon wafer surface to form an oxide thin film and for oxidizing barrier residues on the bevel edges, a second acid for removing the oxide thin film and the oxidized barrier residue, and deionized (DI) water. The first acid is selected from a group consisting of H_2SO_4 , HNO_3 , CH_3COOH , and H_3PO_4 ; the oxidizing agent is selected from H_2O_2 or HNO_3 ; and the second acid is HF. The
25 compositions are as follows: the first acid is present in an amount between 10% to 15% by weight; the oxidizing agent is present in an amount between 30% to 35% by weight; and the second acid is present in an amount between 0.5% to 1.0% by weight.

It is an advantage of the present application that the cleaning composition is
30 capable of dissolving copper on the surface of the wafer and removing copper, which penetrates into the surface layer of the wafer. Furthermore, the mixture is also capable of removing copper and TaN on the bevel edges of the wafer to overcome the

prior art shortcomings.

For convenience, the original claims 1 to 6 of the present application are listed below:

5

Claim 1: A cleaning composition for washing a silicon wafer surface comprising a backside surface and bevel edges, the cleaning composition comprising:

- a first acid for removing copper from the silicon wafer surface;
- an oxidizing agent for oxidizing the silicon wafer surface to form an oxide thin
- 10 film and for oxidizing barrier residue on the bevel edges;
- a second acid for removing the oxide thin film and the oxidized barrier residue;
- and
- deionized (DI) water.

15 Claim 2: The cleaning composition of claim 1 wherein the first acid is selected from a group consisting of H_2SO_4 , HNO_3 , CH_3COOH , and H_3PO_4 .

Claim 3: The cleaning composition of claim 1 wherein the oxidizing agent is selected from H_2O_2 or HNO_3 .

20

Claim 4: The cleaning composition of claim 1 wherein the second acid is HF.

Claim 5: The cleaning composition of claim 1 wherein the first acid is present in an amount between 10% to 15% by weight; the oxidizing agent is present in an amount

25 between 30% to 35% by weight; and the second acid is present in an amount between 0.5% to 1.0% by weight.

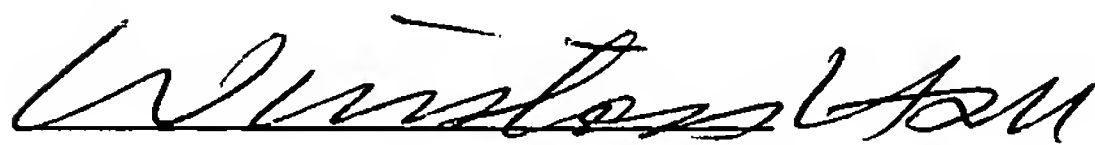
Claim 6: The cleaning composition of claim 1 wherein the barrier residue comprises of either TiN or TaN.

30

Despite the fact that the prior art patent cited above has disclosed an etchant composition relatively similar in content with the cleaning composition disclosed in

the present application, the cleaning purpose, target, and concentration between the two compositions however, are significantly different. Essentially, the main target of the present application is copper whereas the target of prior art patent cited above is aluminum. In addition, the concentrations of the etchant composition disclosed in the prior art patent are also considerably lower than the concentrations disclosed in the present application. It is therefore believed that the claimed invention of the present application is substantially different from the prior art patent CN 1227279A.

Respectfully Submitted,



Date: 8/8/2004

Winston Hsu, Patent Agent No. 41,526

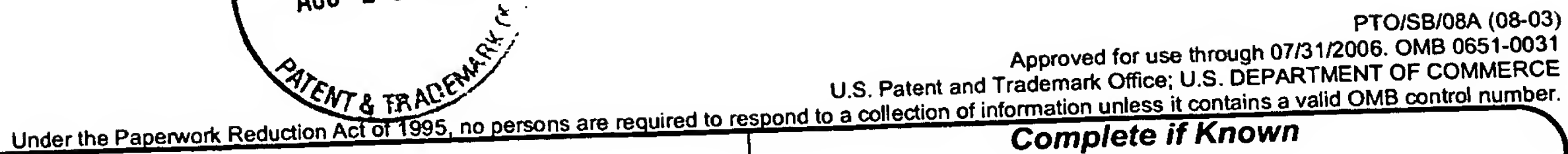
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(Please contact me by e-mail if you need a telephone communication and I will return your call promptly)



Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet

of

Complete if Known

Application Number	10/710,452
Filing Date	07/13/2004
First Named Inventor	Jeng-Wei Yang
Art Unit	
Examiner Name	
Attorney Docket Number	NAUP0470USA1

U. S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

**Examiner
Signature**

Date
Considered

Examiner Signature	<p>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language translation is attached.</p>	Conformance
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